National Flash Flood Basin Delineation Meeting

Draft

Summary

Updated 11/22/00

1. Reaffirmation/Discussion of Final Format & Content of National Small Basin Data Set

The final format and content of the National Small Basin Data Set is listed below (using KLWX as an example):

1) klwx_aggr_basins.shp

This is a polygon shapefile of the final aggregated basins to which the radar bins were mapped. This is the basins file intended for the display. It contains the following attributes:

-- Pfafstetter ID (aggregated in some cases to incorporate basins not associated with a radar bin into the basin(s) directly upstream)

-- Stream Name (included as available from the National Hydrography Dataset)

-- 8 digit HUC# & Name

-- Basin Outlet X & Y coordinates (lon/lat)

-- State, CWA, County Name, FIPS, RFC (from the AWIPS county shapefiles, based on intersection with the basin outlet point)

-- Modified/Aggregation Flag (this field indicates whether the basin has been aggregated from smaller basins--a 1 indicates modification, a 0 indicates no modification)

-- Reservoir Flag (this field indicates whether the basin includes part of a reservoir:1 indicates a reservoir, 0 indicates no reservoir)

-- Basin Centroid X & Y coordinates (lon/lat)

-- Basin Area (square miles)

2) klwx_bins.shp

This is a point shapefile of the radar bins with aggregated Pfafstetter basin IDs joined to it. It contains the following attributes:

-- Azimuth (deg)

-- Range (km)

-- X coordinate (longitude)

-- Y coordinate (latitude)

-- Pfafstetter Basin ID (aggregated)

3) klwx_nhd_rch.shp

This is a polyline shapefile of the National Hydrography Dataset stream lines. It contains numerous fields from the original NHD files. Many of these fields can be eliminated if necessary.

4) klwx_nhd_reg.shp

This is a polygon shapefile of the National Hydrography Dataset water bodies. These include wide rivers, lakes, reservoirs, ponds, etc. It contains numerous fields from the original NHD files. Many of these can be eliminated if necessary.

5) klwx_gen_str.shp

This is a polyline shapefile of the synthetic (or delineated) streams lines. It is important for the forecaster to be able to see both the synthetic stream lines and the NHD. This shapefile's only attribute is an arc ID.

6) klwx_orig_basins.shp

This is a polygon shapefile of the original basins (before aggregation). It contains fields similar to klwx_aggr_basins.shp, but the original Pfafstetter ID is distinguished from the aggregated Pfafstetter ID.

Additionally, NSSL will provide the following:
1. Data for each radar out to 230 km.
2. DEM-derived stream length
3. Stream Order
4. Flow accumulation, if possible taking into account the cumulative area upstream of each HUC (for HUC connectivity)
5. Modified aggregation script (see below)

An issue that came up during the meeting was how to treat a basin that does not contain a radar bin. Three approaches were discussed and are as follows. The first approach (the

approach NSSL had already incorporated into its script) was to merge the basin without a bin with the interbasin immediately upstream from it and any tributaries flowing into it. This would basically take multiple basins and aggregate to one larger basin. The problem with this method is that all the other smaller basins (resolution) was lost. Another approach was to allow the basin without a bin take the value for the adjacent basin that did include a radar bin. The problem with this approach is these radar bins would be counted twice, doubling the volume of water in these areas. The last (and agreed upon) approach was to merge any basin without a bin with only one basin in a "parallel" manner (an interbasin is merged with the tributary reach basin joining into it, or vice versa).

Also discussed during this session was the need to determine how many levels of aggregation/resolution to include for use in FFMP. At this time the thought is to only include one level (basins at 2 mi^2) with AWIPS 5.1.1, and provide additional levels with the next release. For more information see section 6.

2. Establishment of a National Small Basin Repository & Field Access to these Data

1. Data Delivery

Once basins under a particular radar have been delineated by NSSL, the files will be burned on to a CD-ROM. The CDs will be sent and archived at NWSH. Data from the CDs will be transferred to the NOAA1 server for field access. Delivery of the CDs is expected to begin in March 2001 and be completed by August 2001.

Action: Perform test using actual basin delineation data, to assess the amount of time required for a WFO to ftp and transfer basin data off the NOAA1 server. If time is excessive an alternative solution will include delivery of the CD-ROMs to WFOs. OS/HSD - Mercer Status: Open. Files can be compressed and a test will begin as soon as basin data becomes available.

2. Data Access

Data will be made available to the field in a joint effort by OST/Ira Graffman and OS/HSD Michael Mercer. An e-mail to the WFO(s) and Region from NWSH, and an e-mail generated through the AWIPS info server to the affected WFO(s), will be sent as soon as data becomes available on the NOAA1 server. All basin files will be placed on the NOAA1 server behind the AWIPS firewall. NWSH will utilize the standard AWIPS GIS data dissemination methodology. *Note: Basin shapefiles will NOT be stored in "/data/fxa/national/Data" as discussed. AWIPS R5.0 will have a new partition where the shapefiles will reside. Information will be passed along with a complete set of instructions to Regions and WFOs in early Spring 2001.* In addition an AWIPS GIS Map status web page, maintained by OST/Ira Graffman, can be viewed at: http://isl715.nws.noaa.gov/mapdata/newcat/awips_file_status.htm Ira Graffman maintains this web site. This site does provide space for meta data, which NSSL will provide for the general CONUS-wide scale. NSSL will provide meta data using any standards established by

NOAA. WFOs which download basin files before R5.1.2. can use the shapefiles as an underlay for radar data. This will help serve as a spatial reference or for familiarization tool.

Action: NSSL will provide information to determine if WFOs will be allowed to provide the public with basin delineation data sets. NSSL/Ami Arthur

3. Directory Structure

There will be two main basin data directories using a total of 100GB disk space on the NOAA1 server (provided by OOS/OPS31-Randy Chamber and Lloyd Irvin). One directory will store the original shapefiles as prepared by NSSL (will be read only, and use 60GB of disk storage space). The other directory will be for storing local customization or updated shapefiles (will be read-write, and have allocated 40GB of disk storage space). Each main directory will have a sub-directory for each radar. The radar directory used to store updates/customization will have another sub-directory for each WFO that has a dedicated line for a particular radar. Any WFO which alters the original NSSL data set must notify Ira Graffman to ensure a current/updated web site.

3. Provision of Basin Localization/Customization Training

Note: All field and regional personnel are to coordinate with their regional Field Requirements Group (FRG) member to ensure the Basin Localization/Customization pilot course gets into the FY02 NSTEP process.

There are 3 proposed FY02 courses which address training foci to support flash flood operations. These course foci were collectively agreed to by representatives from the regions, OST, OS, and OHD at the November 02, 2000 National Flash Flood Monitoring and Prediction (FFMP) Basin Delineation meeting. The foci include Basin Customization/Localization and Watch, Warning Decision training. Two complimentary approaches were discussed to provide Watch, Warning and Decision training which include WDTB teletraining and a resident COMET WFO Hydromet Course. A summary of these three classes follow.

1. Basin Customization/Localization Training Course

This course would be a residence course offered at COMET. Currently a pilot course is being planned (offered outside of the NSTEP process) and is scheduled for the week of June 18, 2001. The pilot course is targeted for Regional GIS focal points. Representatives at the November meeting proposed to offer a residence course at COMET for FY02. This course would target WFO Service Hydrologist and hydro focal points. There is a prerequisite for this course which states that all attendees must be proficient with ArcView. A list of prerequisites or tutorial will be available before June. Course content includes; an overview to the (FFMP) approach and the basin delineation process, learning to customize and localize the original delineated basin set provided by NSSL, and identifying areas where the basin data set would be modified to enhance services, detailing the process necessary to perform/implement these enhancements.

2. Watch, Warning Decision Training

The WDTB will provide AWIPS 5.0 SCAN/FFMP teletraining in early CY01. This course will be short in duration but will target a large audience (WFO staff). This particular course will be conducted a total of 24 sessions (6 per week for 4 weeks). Additional training will be provided with each new major functional release of AWIPS

The purposed WFO Hydromet Course would provide additional training which would focus on heavy precipitation and flash flooding . This would be a residence course at COMET and have a target audience of Service Hydrologists and WFO hydro focal points. Course content for the course would focus on the science behind heavy precipitation and flash flooding, as well as the science behind new watch, warning and decision tools. Several cases studies would be used to illustrate the utility of the new FFMP application.

4. Training Issues - Lessons Learned at WFO SLC

Through expansion with FFMP, over time WFOs will need to adjust locally specified alert thresholds to ensure FF assessment is more accurate for their domain.

Offices (WFOs) will need to run level II data thru FFMP to calibrate themselves.

Forecasters need to understand what are the best time scales to evaluate for different cases.

WFOs need spatial reference data (high resolution). How can we push this? Have regions get involved.

RFC GIS expertise may be appropriate to help WFOs with appropriate D2D map background information

FF guidance values from RFCs were never designed to be used at this scale, so calibration of FFMP with past events of flooding and non-events is essential

Time series output, showing rainfall rate information is a new concept for forecasters and will require training

High resolution geo-political information, basin backgrounds, DEM derived streams are required in D2D, but must be engineered to show up only at maximum zoom to prevent performance degradation

5. Basin Legacy Issues

National Basin Delineation Legacy Issues

- Continued training/troubleshooting

- Even after formal training, many obstacles will likely be encountered during the basin editing and localization phase.
- Data set updates
  - As better data becomes available, the NED will be updated, making additional delineation to improve the original basin data sets possible.
- Feedback between WFOs and EROS Data Center
  - A standardized procedure will be needed to efficiently relay information to EROS about errors found in the data sets, as well as information to the WFOs about NED updates and improvements.
- RFC basins/issues
- AMBER/FFMP enhancements
  - The addition of terrain, land use data, etc. would add pertinent information to the algorithm output.

6. Demonstration of Current FFMP Capabilities and Discussion of Small Basin FFMP Capabilities Scheduled for Implementation with AWIPS 5.1.2

For more information on FFMP visit: http://www.nws.noaa.gov/tdl/scan/ffmp.html

During the meeting the following issues were addressed.

real time ABR database
high resolution spatial reference data
basin rate of accumulation as image

1. Rate and Accumulation more important than the FFG.
2. Alarm on rate (hourly, above FFG)
3. Do not save diff and ratio. Calculate in processor and display.
4. Consider localization vs. front-loading.
5. To get rate: average current and previous volscan rates.
6. Use PPS algorithms when calculating rate. The users are familiar with this algorithm.
7. via localization, provide new integer basin IDs (index) then use the Pfafstetter to create connectivity tables (which basins are parent/sub-basins).
8. Left click on active extension = zoom-and-investigate (county or MAP basin to small basin), right click = produce trend. for display - first display large basins (MAP), and color code them according to the 'worst' small basin inside. The user can then click on the large basin to investigate = zoom in and render all small basins. This can save render time for all of the polygon fills.
9. Via localization, create readable tables for FFG grid-to-basin and radar bin-to-basin relations, so they can be read by the processor and display.
10. Front load bin areas
11. Should we use netCDF or flatfile storage? Not Informix.
12. Perhaps implement an alarm each time a basin surpasses FFG?
13. (need to handle old data for playback capability.)
14. Should we even try to make the number of times we handle (ie: 1,3,6) editable by the

user? (This is for monitoring. It is already taken care of in the trend of we adopt Paul's trend.)